IBM System x3650 M4

IBM Redbooks Product Guide

The IBM® System x3650 M4 server provides outstanding performance for your business-critical applications. Its energy-efficient design supports more cores, memory, and data capacity in a scalable 2U package that is easy to service and manage. With more computing power per watt and the latest Intel Xeon processors, you can reduce costs while maintaining speed and availability.

Suggested use: database, virtualization, enterprise applications, collaboration/email, streaming media, web, HPC, Microsoft RemoteFX, and cloud applications.

Figure 1 shows the IBM System x3650 M4.

Figure 1. The IBM System x3650 M4

Did you know?

The x3650 M4 offers a flexible, scalable design and simple upgrade path to 16 hard-disk drives (HDDs) or solid-state drives (SSDs) plus optical and tape drives at the same time, with up to six PCIe Gen 3 slots and up to 768 GB of memory. This flexible onboard Ethernet solution provides four standard embedded Gigabit Ethernet ports and two optional embedded 10 Gb Ethernet ports without occupying PCIe slots. Comprehensive systems management tools with the next-generation Integrated Management Module II (IMM2) make it easy to deploy, integrate, service, and manage.

Key features

The x3650 M4 is an outstanding 2U two-socket business-critical server, offering improved performance and pay-as-you grow flexibility along with new features that improve server management capability. This powerful system is designed for your most important business applications and cloud deployments.

Combining balanced performance and flexibility, the x3650 M4 is a great choice for small and medium businesses up to the large enterprise. It can provide outstanding uptime to keep business-critical applications and cloud deployments running safely. Ease of use and comprehensive systems management tools make it easy to deploy. Outstanding RAS and high-efficiency design improve your business environment and help save operational costs.

Scalability and performance

The x3650 M4 offers numerous features to boost performance, improve scalability, and reduce costs:

- Intel Xeon processor E5-2600 v2 product family
  - Improves productivity by offering superior system performance with 4-core and 6-core processors (up to 3.5 GHz core speeds), 8-core processors (up to 3.3 GHz core speeds), 10-core processors (up to 3.0 GHz core speeds), and 12-core processors (up to 2.7 GHz core speeds), up to 30 MB of L3 cache, and up to two 8 GT/s QPI interconnect links.
  - Supports up to two processors, 24 cores, and 48 threads maximize the concurrent execution of multi-threaded applications.
  - Supports up to 1866 MHz memory speeds.
  - Will support up to 768 GB memory with 32 GB LRDIMMs or HCDIMMs when and if they become available.
- Intel Xeon processor E5-2600 product family
  - Improves productivity by offering superior system performance with 8-core processors and up to 2.9 GHz core speeds, up to 20 MB of L3 cache, and up to two 8 GT/s QPI interconnect links.
  - Supports up to two processors, 16 cores, and 32 threads maximize the concurrent execution of multi-threaded applications.
  - Supports up to 1600 MHz memory speeds.
  - Supports up to 768 GB memory with 32 GB LRDIMMs or HCDIMMs.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.
- Intel Hyper-Threading Technology boosts performance for multi-threaded applications by enabling simultaneous multi-threading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better utilize the hardware for virtualization workloads.
- Intel Advanced Vector Extensions (AVT) significantly improve floating-point performance for compute-intensive technical and scientific applications.
- Will support 12 Gbps SAS RAID portfolio when and if it becomes available.
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.

- Up to 32 1.8-inch SSD bays, or up to 16 2.5-inch bays, or up to 6 3.5-inch bays, together with internal backup and an optical drive at the same time, provide a flexible and scalable all-in-one platform to meet your increasing demands.
- The server has four integrated Gigabit Ethernet ports and two optional 10 Gb Ethernet ports with mezzanine cards that do not consume PICe slots.
- The server offers PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by almost 100% (8 GTps per link using 128b/130b encoding) compared to the previous generation of PCI Express 2.0 (5 GTps per link using 8b/10b encoding).
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family. This integration helps to dramatically reduce I/O latency and increase overall system performance.
- Support for NVIDIA Quadro graphics processing units (GPUs) to maximize computing power

Availability and serviceability

The x3650 M4 provides many features to simplify serviceability and increase system uptime:

- The server offers memory mirroring and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as CPU, memory, and adapter cards.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The server has up to two redundant hot-swap power supplies and four hot-swap dual-motor redundant fans (two fan zones with an N+1 fan design) to provide availability for business-critical applications.
- The power source independent light path diagnostics panel and individual light path LEDs quickly lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Predictive Failure Analysis (PFA) detects when system components (processors, VRMs, memory, HDDs, fans, and power supplies) operate outside of standard thresholds and generates proactive alerts in advance of a possible failure, therefore increasing uptime.
- Solid-state drives (SSDs) offer significantly better reliability than traditional mechanical HDDs for greater uptime.
- Built-in Integrated Management Module Version II (IMM2) continuously monitors system parameters, triggers alerts, and performs recovering actions in case of failures to minimize downtime.
- Built-in diagnostics, using Dynamic Systems Analysis (DSA) Preboot, speed up troubleshooting tasks to reduce service time.
- Three-year customer-replaceable unit and on-site limited warranty, 9x5 next business day. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the x3650 M4:

- The server includes an Integrated Management Module II (IMM2) to monitor server availability and perform remote management.
- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.

- Integrated Trusted Platform Module (TPM) 1.2 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- IBM Systems Director is included for proactive systems management. It offers comprehensive systems management tools that help to increase uptime, reduce costs, and improve productivity through advanced server management capabilities.
- Intel Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supported operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.

Energy efficiency

The x3650 M4 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient planar components help lower operational costs.
- Highly efficient 550 W, 750 W, and 900 W AC power supplies with 80 PLUS Platinum certification. Available 750W DC power option.
- Intel Xeon processor E5-2600 and E5-2600 v2 product families offer significantly better performance over the previous generation while fitting into the same thermal design power (TDP) limits.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed, to reduce power draw.
- Low-voltage Intel Xeon processors draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.35 V DDR3 memory RDIMMs consume 15% less energy compared to 1.5 V DDR3 RDIMMs.
- Solid state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which is a part of IBM Calibrated Vectored Cooling™ technology. Hexagonal holes can be grouped more densely than round holes, providing more efficient airflow through the system.
- IBM Systems Director Active Energy Manager™ provides advanced data center power notification and management to help achieve lower heat output and reduced cooling needs.

Locations of key components and connectors

Figure 2 shows the front of the server.

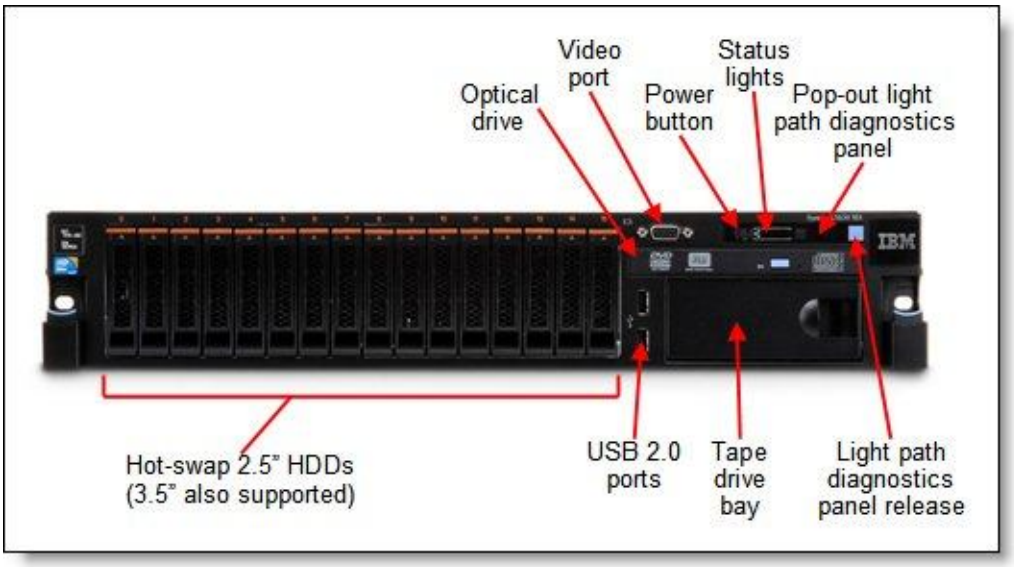

Figure 2. Front view of the IBM System x3650 M4

Figure 3 shows the rear of the server.

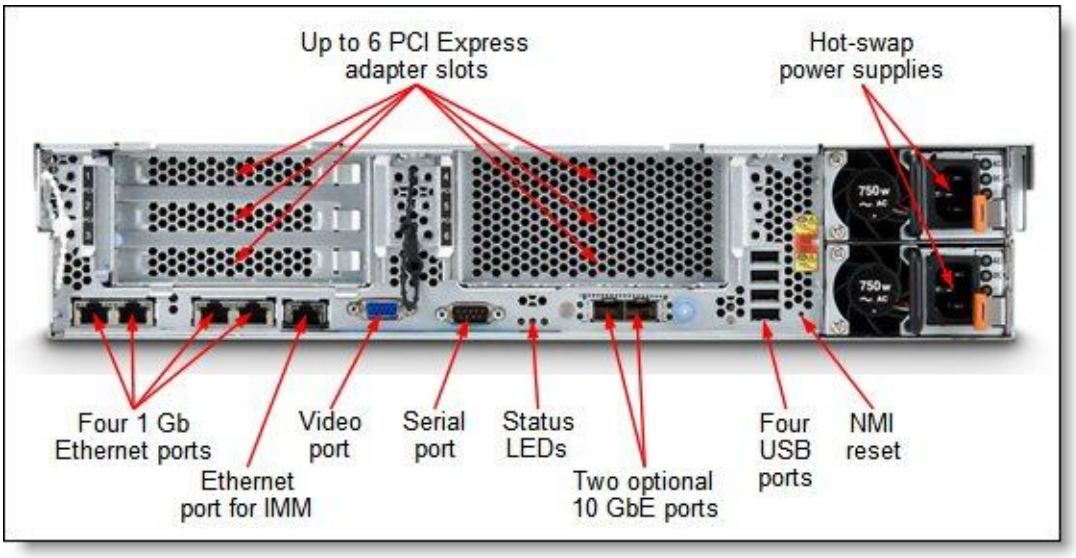

Figure 3. Rear view of the IBM System x3650 M4

Figure 4 shows the locations of key components inside the server.

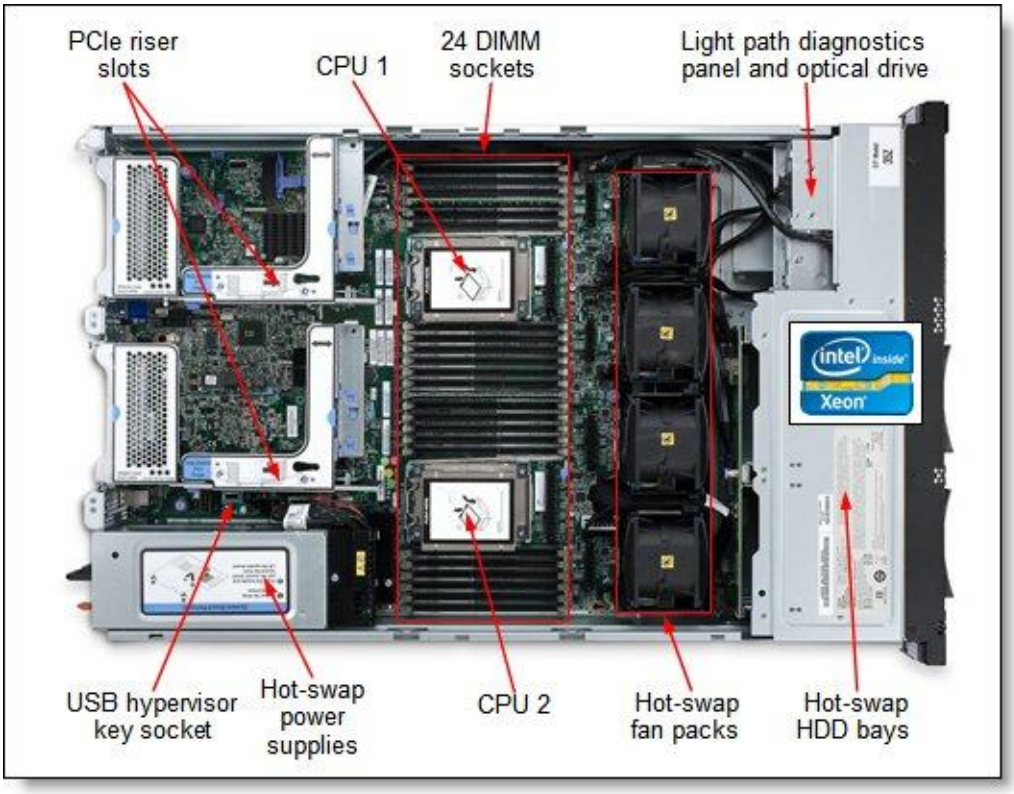

Figure 4. Inside view of the IBM System x3650 M4

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (part 1)

Components	Specification
Form factor	2U Rack.
Processor	E5-2600 v2: Up to two Intel Xeon processor E5-2600 v2 product family CPUs with 12 cores (up to 2.7 GHz) or ten cores (up to 3.0 GHz) or eight cores (up to 3.3 GHz) or six cores (up to 3.5 GHz) or four cores (up to 3.5 GHz). Two QPI links up to 8.0 GT/s each. Up to 1866 MHz memory speed. Up to 30 MB L3 cache. E5-2600: Up to two Intel Xeon processor E5-2600 product family CPUs with eight cores (up to 2.9 GHz) or six cores (up to 2.9 GHz) or four cores (up to 3.3 GHz). Two QPI links up to 8.0 GT/s each. Up to 1600 MHz memory speed. Up to 20 MB L3 cache.
Chipset	Intel C602J.
Memory	Up to 24 DIMM sockets (12 DIMMs per processor). E5-2600 v2: RDIMMs and UDIMMs are supported. Support for HyperCloud DIMMs and LRDIMMs (Load Reduced DIMMs) is planned for later in 2013. Memory types cannot be intermixed. Memory speed up to 1866 MHz. E5-2600: RDIMMs, UDIMMs, HyperCloud DIMMs, and LRDIMMs (Load Reduced DIMMs) are supported, but memory types cannot be intermixed. Memory speed up to 1600 MHz.
Memory maximums	E5-2600 v2: ● With RDIMMs: Up to 384 GB with 24x 16 GB RDIMMs and two processors ● With UDIMMs: Up to 128 GB with 16x 8 GB UDIMMs and two processors ● With HyperCloud DIMMs (support is planned for later in 2013): Up to 768 GB with 24x 32 GB HyperCloud DIMMs and two processors ● With LRDIMMs (support is planned for later in 2013): Up to 768 GB with 24x 32 GB LRDIMMs and two processors E5-2600: ● With RDIMMs: Up to 384 GB with 24x 16 GB RDIMMs and two processors ● With UDIMMs: Up to 64 GB with 16x 4 GB UDIMMs and two processors ● With HyperCloud DIMMs: Up to 768 GB with 24x 32 GB HyperCloud DIMMs and two processors ● With LRDIMMs: Up to 768 GB with 24x 32 GB LRDIMMs and two processors
Memory protection	ECC, Chipkill, memory mirroring, and memory rank sparing.
Disk drive bays	Up to 32 1.8" SSD bays, or 16 2.5" hot-swap SAS/SATA bays, or up to six 3.5" hot-swap SAS/SATA bays, or up to eight 2.5" Simple Swap SATA bays, or up to six 3.5" Simple Swap SATA bays.
Maximum internal storage	Up to 19.2 TB with 1.2 TB 2.5" SAS HDDs, up to 16 TB with 1 TB 2.5" NL SAS/SATA HDDs, up to 12.8 TB with 400 GB 1.8" SATA SSDs, up to 25.6 TB with 1.6 TB 2.5" SAS SSDs, or up to 24 TB with 4 TB 3.5" NL SAS/SATA HDDs. Intermix of SAS/SATA is supported.
RAID support	6 Gb SAS/SATA: RAID 0, 1, 10 with integrated M5110e or optional M5110; optional upgrades to RAID 5, 50 are available (zero-cache; 512 MB battery-backed cache; 512 MB or 1 GB flash-backed cache). Optional upgrade to RAID 6, 60 is available for M5110e or M5110 with 512 MB or 1 GB cache upgrades. 12 Gb SAS/SATA (support is planned for later in 2013): RAID 0, 1, 10 with optional M5210; optional upgrades to RAID 5, 50 are available (zero-cache; 1 GB non-backed cache; 1 GB or 2 GB flash-backed cache). Optional upgrade to RAID 6, 60 is available for M5210 with 1 GB or 2 GB cache upgrades.

Table 1. Standard specifications (part 2)

Components	Specification
Optical drive bays	One bay for optional DVD-ROM or Multiburner drive.
Tape drive bays	Optional Tape Enablement Kit is available to support one DDS5, DDS6, or RDX internal USB tape drive.
Network interfaces	Four integrated Gigabit Ethernet 1000BASE-T ports (RJ-45); two embedded 10 Gb Ethernet ports (10GBASE-T RJ-45 or 10GBASE-SR SFP+ based) on optional 10 Gb Ethernet mezzanine card (does not consume PCIe slot).
PCI Expansion slots	Up to six slots depending on the riser cards installed. The slots are as follows: ● Slot 1: PCIe 3.0 x8; full-height, full-length ● Slot 2: PCIe 3.0 x8; full-height, half-length ● Slot 3: PCIe 3.0 x8; full-height, half-length ● Slot 4: Optional, requires second processor and second riser card ● Slot 5: Optional, requires second processor and second riser card ● Slot 6: Optional, requires second processor and second riser card Optional riser cards available with PCIe x8 or PCIe x16 or PCI-X slots.
Ports	Two USB 2.0 and one DB-15 video on front. Four USB 2.0, one DB-15 video, one DB-9 serial, one RJ-45 systems management, four RJ-45 GbE network ports, two optional RJ-45 or SFP+ 10 GbE network ports on rear. Two internal USB ports (for embedded hypervisor and internal tape drive).
Cooling	IBM Calibrated Vectored Cooling™ with up to four redundant hot swap fans (three standard, additional fan with second processor or with the x3650 M4 Thermal Solution Kit); two fan zones with N+1 fan design; each fan has two motors.
Power supply	Up to two redundant hot-swap 550 W AC or 750 W AC or 900 W AC power supplies (all 80 PLUS Platinum certification), or -48V 750 W DC power supply options.
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Hot-swap parts	Hard drives, power supplies, and fans.
Systems management	UEFI, IBM Integrated Management Module II (IMM2), Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and Active Energy Manager, IBM ServerGuide. Optional IBM Integrated Management Module Advanced Upgrade software feature for remote presence.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM).
Operating systems supported	Microsoft Windows Server 2012 R2 (support is planned for earlier in 2014), 2012, 2008 R2 and 2008, Red Hat Enterprise Linux 5 and 6, SUSE Linux Enterprise Server 10 and 11, VMware ESX 4.1 and VMware ESXi 4.1 embedded hypervisor (not supported with E5-2600 v2 models), VMware vSphere 5 (ESXi) and vSphere 5.1 (ESXi).
Limited warranty	Three-year customer-replaceable unit and on-site limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through IBM ServicePacs®: Four-hour or two-hour response time, eight-hour fix time, one-year or two-year warranty extension, remote technical support for IBM hardware and some IBM and third-party applications.
Dimensions	Height: 86 mm (3.4 in), width: 445 mm (17.5 in), depth: 746 mm (29.4 in)
Weight	Minimum configuration: 25 kg (55 lb), maximum: 30 kg (65 lb)

The x3650 M4 servers are shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Rack Installation Instructions
- Documentation CD that contains the *Installation and User's Guide*
- IBM Systems Director Flyer
- IBM System x® Gen-III Slides Kit
- IBM System x Gen-III Cable Management Arm (CMA)
- 2.8 m (9.18 in) C13-C14 power cord (one for models with one power supply, and two for models with two power supplies)

Standard models

The following table lists the standard models.

Table 2. Standard models (Part 1: Intel Xeon processor E5-2600 v2 product family)

MTM*	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
Models announced September 2013									
7915-23x	1x E5-2637 v2 4C 3.5GHz 15MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-33x	1x E5-2643 v2 6C 3.5GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-43x	1x E5-2667 v2 8C 3.3GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-53x	1x E5-2650L v2 10C 1.7GHz 25MB 1600MHz 70W	1x 8GB 1600MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-73x	1x E5-2695 v2 12C 2.4GHz 30MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-83x	1x E5-2697 v2 12C 2.7GHz 30MB 1866MHz 130W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-A3x	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-B3x	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 4GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-C3x	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-C5x	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	6x 3.5" HS / 6	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-D3x	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-F3x	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 550W HS / 2
7915-G3x	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915-H3x	1x E5-2660 v2 10C 2.2GHz 25MB 1866MHz 95W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915-J3x	1x E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 750W HS / 2
7915-L3x	1x E5-2680 v2 10C 2.8GHz 25MB 1866MHz 115W	1x 8GB 1866MHz	M5110e 1GB Flash	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2
7915-M3x	1x E5-2690 v2 10C 3.0GHz 25MB 1866MHz 130W	1x 8GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	1x 900W HS / 2

* x in the Machine Type Model (MTM) represents a country-specific letter (for example, the EMEA MTM is 7915-A3G, and the US MTM is 7915-A3U). Ask an IBM representative for specifics.
† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, TDP.
§ For models A3x and B3x, the standard DIMM is rated at 1600 MHz, but operates at up to 1333 MHz to match the processor memory speed. Actual memory speed maximums depend on several factors, as described in "Memory options".

Table 2. Standard models (Part 2: Intel Xeon processor E5-2600 product family)

Model	Intel Xeon processors† (two maximum)	Memory	RAID	Disk bays	Disks	GbE	Optical	Power supply
Models announced August 2012								
7915-32x	1x E5-2643 4C 3.3GHz 10MB 1600MHz 130W	1x 4 GB	M5110e	8 / 16 2.5" HS	Open	4	Open	1x 900W
7915-GSx (SAP*)	1x E5-2650 8C 2.0GHz 20MB 1600MHz 95W	4x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	1x 1TB NL SAS 7x 600GB SAS VMware key*	4	Open	2x 750W
7915-M2x	1x E5-2690 8C 2.9GHz 20MB 1600MHz 135W	1x 4 GB	M5110e	8 / 16 2.5" HS	Open	4	Open	1x 900W
Models announced March 2012								
7915-A2x	1x E5-2603 4C 1.8GHz 10MB 1066MHz 80W	1x 4 GB	M5110e	8 / 16 2.5" HS	Open	4	Open	1x 550W
7915-B2x	1x E5-2609 4C 2.4GHz 10MB 1066MHz 80W	1x 4 GB	M5110e	8 / 16 2.5" HS	Open	4	Open	1x 550W
7915-C2x	1x E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	8 / 16 2.5" HS	Open	4	Open	1x 550W
7915-C4x	1x E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	6 / 6 3.5" HS	Open	4	Open	1x 550W
7915-D2x	1x E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-F2x	1x E5-2640 6C 2.5GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-G2x	1x E5-2650 8C 2.0GHz 20MB 1600MHz 95W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-52x	1x E5-2650L 8C 1.8GHz 20MB 1600MHz 70W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 550W
7915-H2x	1x E5-2660 8C 2.2GHz 20MB 1600MHz 95W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-62x	1x E5-2665 8C 2.4GHz 20MB 1600MHz 115W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-J2x	1x E5-2670 8C 2.6GHz 20MB 1600MHz 115W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 750W
7915-L2x	1x E5-2680 8C 2.7GHz 20MB 1600MHz 130W	1x 8 GB	M5110e 1GB flash	8 / 16 2.5" HS	Open	4	Open	1x 900W

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, power consumption
* Model GSx includes preinstalled SAP Discovery System V5 -- see below. Also includes IBM Blank USB Memory Key for VMWare ESXi Downloads, part number 41Y8298

Refer to the Specifications section for information about standard features of the server.

Workload optimized model - SAP Discovery system

Model GSx comes preinstalled with SAP Discovery system V5. The SAP Discovery system is a fully configured and preintegrated service-oriented architecture (SOA) platform enabler for SAP development environments. The IBM Systems solution with SAP Discovery system provides a robust IBM System x hardware platform for evaluating SAP software. The x3650 M4 model is pre-installed with a wide range of SAP software and development tools, the solution offers a fast, easy and cost-effective way to explore, evaluate and train on SAP products including SAP HANA, before deploying new software in your infrastructure.

Learn more at http://ibm.com/systems/x/solutions/sap/discoverysystem

Note: The model that includes the preinstalled copy of SAP software does not include a license to use such SAP software. Please contact your SAP representative to obtain the appropriate license rights to use the SAP software.

Express models

The following table lists the express models.

Table 3. Express models (Part 1: Intel Xeon processor E5-2600 v2 product family)

MTM*	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
United States, Canada, Latin America									
7915-EFU	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-EGU	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-EHU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-EJU	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 16GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2
7915-EKU	1x E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	1x 16GB 1866MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	2x 750W HS / 2
Latin America (Brazil only)									
7915-EPU	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915-EQU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	2x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
Asia Pacific (China only)									
7915-ELC	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915-EOC	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915-ERC	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915-ESC	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915-ETC	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Optional	1x 550W HS / 2
7915-EUC	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1866MHz§	M5110e	8x 2.5" HS / 16	2x 300GB 15K	4	3 / 6	Optional	1x 550W HS / 2
7915-EVC	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	2x 750W HS / 2
7915-EWC	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 8GB 1600MHz§	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Optional	2x 750W HS / 2

Table 3. Express models (Part 1: Intel Xeon processor E5-2600 v2 product family) (continued)

MTM*	Intel Xeon processors† (two maximum)	Memory	RAID	Drive bays (std / max)	Drives	GbE	I/O slots (std / max)	Optical	Power supply (std / max)
Europe									
7915-E6G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915-E7G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-E9G	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2
Central and Eastern Europe (CEE) and Middle East and Africa (MEA)									
7915-E6G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	2x 300GB 10K	4	3 / 6	Multi-burner	2x 550W HS / 2
7915-E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-E9G	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 750W HS / 2
Russia/Commonwealth of Independent States (CIS)									
7915-E7G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2
7915-E8G	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8GB 1600MHz	M5110e 512MB (f)	8x 2.5" HS / 16	Open bay	4	3 / 6	Multi-burner	1x 550W HS / 2

* MTM = Machine Type Model
† Processor detail: Processor quantity and model, number of cores, core speed, L3 cache, memory speed, TDP.
(f) The ServeRAID M5110e RAID controller in this model includes flash-backed cache.
§ For model EFU, the standard DIMM is rated at 1600 MHz, but operates at up to 1333 MHz to match the processor memory speed. For models ELC, EOC, ERC, and ESC, the standard DIMM is rated at 1866 MHz, but operates at up to 1333 MHz to match the processor memory speed. For models ETC and EUC, the standard DIMM is rated at 1866 MHz, but operates at up to 1600 MHz to match the processor memory speed. Conversely, for model EWC, the processor memory speed is rated at 1866 MHz, but operates at up to 1600 MHz to match the rated speed of the installed DIMM. Actual memory speed maximums depend on several factors, as described in "Memory options".

Table 3. Express models (Part 2: Intel Xeon processor E5-2600 product family)

Model	Processor	Memory	RAID controller	Disk bays	Disks	GbE	Slots	Optical	Power
North America (NA), Latin America (LA)									
7915-EAU	1x Xeon E5-2609 4C 2.4GHz 10MB 1066MHz 80W	1x 4 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-EBU	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1 x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-ECU	1x Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1 x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 750 W
7915-EDU	1x Xeon E5-2640 6C 2.5GHz 15MB 1333MHz 95W	2 x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	2x 750 W
7915-EEU	1x Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	1 x 8 GB	M5110e 1GB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 750 W
Europe									
7915-E1G	1x Xeon E5-2603 4C 1.8GHz 10MB 1066MHz 80W	1x 4 GB	M5110e	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-E2G	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	8x 2.5" HS / 16	2 x 300GB 2.5" 10k HS SAS	4	3 / 6	Multi-burner	2x 550 W
7915-E3G	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-E4G	1x Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	2 x 300GB 2.5" 10k HS SAS	4	3 / 6	Multi-burner	1x 750 W
7915-E5G	2x Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	2x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	3 x 300GB 2.5" 10k HS SAS	4	6 / 6	Multi-burner	2x 750 W

Table 3. Express models (Part 2: Intel Xeon processor E5-2600 product family) (continued)

Model	Processor	Memory	RAID controller	Disk bays	Disks	GbE	Slots	Optical	Power
Central and Eastern Europe (CEE) and Middle East & Africa (MEA)									
7915-E1G	1x Xeon E5-2603 4C 1.8GHz 10MB 1066MHz 80W	1x 4 GB	M5110e	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-E2G	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	8x 2.5" HS / 16	2 x 300GB 2.5" 10k HS SAS	4	3 / 6	Multi-burner	2x 550 W
7915-E3G	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-E4G	1x Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	2 x 300GB 2.5" 10k HS SAS	4	3 / 6	Multi-burner	1x 750 W
7915-E5G	2x Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	2x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	3 x 300GB 2.5" 10k HS SAS	4	6 / 6	Multi-burner	2x 750 W
7915-K1G	1x Xeon E5-2609 4C 2.4GHz 10MB 1066MHz 80W	1x 4 GB	M5110e	6x 3.5" HS/ 6	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-K4G	1x Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	2x 750 W
7915-K5G	1x Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	2x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	2x 750 W
Russia/Commonwealth of Independent States (CIS)									
7915-K2G	1x Xeon E5-2603 4C 1.8GHz 10MB 1066MHz 80W	1x 4 GB	M5110e 512MB Battery	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-K3G	1x Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	1x 550 W
7915-K4G	1x Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	1x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	2x 750 W
7915-K5G	1x Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	2x 8 GB	M5110e 512MB Flash	8x 2.5" HS / 16	Optional	4	3 / 6	Multi-burner	2x 750 W

Processor options

The x3650 M4 supports the processor options listed in the following table. The server supports up to two processors. This table shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor, this processor is only available through CTO. Second processor options include an additional cooling fan.

Table 4. Processor options (Part 1: Intel Xeon processor E5-2600 v2 product family)

Part number	Feature codes*	Description	Standard models where used
46W4360	A3VR / A3V7	Intel Xeon Processor E5-2603 v2 4C 1.8GHz 10MB Cache 1333MHz 80W	A3x
46W4361	A3VS / A3V8	Intel Xeon Processor E5-2609 v2 4C 2.5GHz 10MB Cache 1333MHz 80W	B3x
46W4363	A3VU / A3VA	Intel Xeon Processor E5-2620 v2 6C 2.1GHz 15MB Cache 1600MHz 80W	C3x
00Y7650	A4EQ / A4EN	Intel Xeon Processor E5-2628L v2 8C 1.9GHz 20MB Cache 1600MHz 70W	-
46W4364	A3VV / A3VB	Intel Xeon Processor E5-2630 v2 6C 2.6GHz 15MB Cache 1600MHz 80W	D3x
46W4376	A3W7 / A3VP	Intel Xeon Processor E5-2630L v2 6C 2.4GHz 15MB Cache 1600MHz 60W	-
46W4362	A3VT / A3V9	Intel Xeon Processor E5-2637 v2 4C 3.5GHz 15MB Cache 1866MHz 130W	23x
46W4367	A3VY / A3VE	Intel Xeon Processor E5-2640 v2 8C 2.0GHz 20MB Cache 1600MHz 95W	F3x
46W4371	A3W2 / A3VJ	Intel Xeon Processor E5-2643 v2 6C 3.5GHz 25MB Cache 1866MHz 130W	33x
00Y7652	A4ER / A4EP	Intel Xeon Processor E5-2648L v2 10C 1.9GHz 25MB Cache 1866MHz 70W	-
46W4365	A3VW / A3VC	Intel Xeon Processor E5-2650 v2 8C 2.6GHz 20MB Cache 1866MHz 95W	G3x
46W4375	A3W6 / A3VN	Intel Xeon Processor E5-2650L v2 10C 1.7GHz 25MB Cache 1600MHz 70W	53x
46W4366	A3VX / A3VD	Intel Xeon Processor E5-2660 v2 10C 2.2GHz 25MB Cache 1866MHz 95W	H3x
46W4372	A3W3 / A3VK	Intel Xeon Processor E5-2667 v2 8C 3.3GHz 25MB Cache 1866MHz 130W	43x
46W4369	A3W0 / A3VG	Intel Xeon Processor E5-2670 v2 10C 2.5GHz 25MB Cache 1866MHz 115W	J3x
46W4370	A3W1 / A3VH	Intel Xeon Processor E5-2680 v2 10C 2.8GHz 25MB Cache 1866MHz 115W	L3x
46W4377	A3W8 / A3VQ	Intel Xeon Processor E5-2690 v2 10C 3.0GHz 25MB Cache 1866MHz 130W	M3x
46W4373	A3W4 / A3VL	Intel Xeon Processor E5-2695 v2 12C 2.4GHz 30MB Cache 1866MHz 115W	73x
46W4374	A3W5 / A3VM	Intel Xeon Processor E5-2697 v2 12C 2.7GHz 30MB Cache 1866MHz 130W	83x

* The first feature code is for the first processor; the second feature code is for the second processor

Table 4. Processor options (Part 2: Intel Xeon processor E5-2600 product family)

Part number	Feature codes*	Description	Models where used
69Y5323	A1KJ / A1KV	Intel Xeon E5-2603 4C 1.8GHz 10MB 1066MHz 80W	A2x
69Y5325	A1KL / A1KX	Intel Xeon E5-2609 4C 2.4GHz 10MB 1066MHz 80W	B2x
69Y5326	A1KM / A1KY	Intel Xeon E5-2620 6C 2.0GHz 15MB 1333MHz 95W	C2x, C4x
69Y5327	A1KN / A1KZ	Intel Xeon E5-2630 6C 2.3GHz 15MB 1333MHz 95W	D2x
94Y6603	A2AW / A2AZ	Intel Xeon E5-2630L 6C 2.0GHz 15MB 1333MHz 60W	-
94Y6686	A2VP / A2QM	Intel Xeon E5-2637 2C 3.0GHz 5MB 1600MHz 80W	-
69Y5328	A1KP / A1L0	Intel Xeon E5-2640 6C 2.5GHz 15MB 1333MHz 95W	F2x
94Y6604	A2AX / A2B0	Intel Xeon E5-2643 4C 3.3GHz 10MB 1600MHz 130W	32x
00D9451	A396 / A398	Intel Xeon E5-2648L 8C 1.8GHz 20MB 1600MHz 70W	-
69Y5329	A1KQ / A1L1	Intel Xeon E5-2650 8C 2.0GHz 20MB 1600MHz 95W	G2x, GSx
69Y5336	A1KU / A1L5	Intel Xeon E5-2650L 8C 1.8GHz 20MB 1600MHz 70W	52x
00D9450	A395 / A397	Intel Xeon E5-2658 8C 2.1GHz 20MB 1600MHz 95W	-
69Y5330	A1KR / A1L2	Intel Xeon E5-2660 8C 2.2GHz 20MB 1600MHz 95W	H2x
94Y6687	A2GU / A2GV	Intel Xeon E5-2665 8C 2.4GHz 20MB 1600MHz 115W	62x
69Y5333	A1KT / A1L4	Intel Xeon E5-2667 6C 2.9GHz 15MB 1600MHz 130W	-
94Y6602	A2AV / A2AY	Intel Xeon E5-2670 8C 2.6GHz 20MB 1600MHz 115W	J2x
69Y5331	A1KS / A1L3	Intel Xeon E5-2680 8C 2.7GHz 20MB 1600MHz 130W	L2x
94Y6685	A2VN / A2QL	Intel Xeon E5-2690 8C 2.9GHz 20MB 1600MHz 135W	M2x

* The first feature code is for the first processor; the second feature code is for the second processor

Memory options

IBM DDR3 memory is compatibility tested and tuned for optimal System x performance and throughput. IBM memory specifications are integrated into the light path diagnostics for immediate system performance feedback and optimum system uptime. From a service and support standpoint, IBM memory automatically assumes the IBM system warranty, and IBM provides service and support worldwide.

The IBM System x3650 M4 supports DDR3 memory. The server supports up to 12 DIMMs when one processor is installed and up to 24 DIMMs when two processors are installed. Each processor has four memory channels, and there are three DIMMs per channel.

The following rules apply when selecting the memory configuration:

- Server supports UDIMMs, RDIMMs, HyperCloud DIMMs (also known as HCDIMMs), and LRDIMMs.
- Mixing different types of memory (UDIMMs, RDIMMs, HyperCloud DIMMs, and LRDIMMs) is not supported.
- Mixing 1.5 V and 1.35 V DIMMs is supported; in such a case, all DIMMs operate at 1.5 V.

- Maximum number of ranks per one channel is eight (with the exception of Load Reduced DIMMs and HyperCloud DIMMs where more than eight ranks are supported, because one quad-rank LRDIMM or HCDIMM provides the reduced electrical load on a memory bus).
- The maximum quantity of DIMMs that can be installed in the server depends on the number of CPUs, DIMM type, rank, and operating voltage, as shown in the "Max. qty supported" row in Table 5.
- All DIMMs in the server operate at the same speed, which is determined as the lowest value of:
  - Memory speed that is supported by the specific CPU.
  - Lowest of maximum operating speeds for selected memory configuration that depends on rated speed, operating voltage, and quantity of DIMMs per channel, as shown under "Maximum operating speed" section in the table.

The following table (Parts 1, 2, 3, and 4) shows the characteristics of the supported DIMMs. Tables cells highlighted with a gray background indicate when the combination of DIMM voltage and the number of DIMMs per channel still allows the DIMMs to operate at a rated speed.

Table 5. Maximum memory speeds (Part 1: Intel Xeon processor E5-2600 v2 product family - RDIMMs)

DIMM specification	**RDIMM**					
Rank	Single rank			Dual rank		
Part numbers	00D5024 (4 GB) 00D5036 (8 GB)		00D5020 (4 GB) 00D5032 (8 GB)	00D5044 (8 GB) 46W0672 (16 GB)		00D5048 (16 GB)
Rated speed	1600 MHz		1866 MHz	1600 MHz		1866 MHz
Rated voltage	1.35 V		1.5 V	1.35 V		1.5 V
Operating voltage	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V	1.5 V
Max qty supported*	24	24	24	24	24	24
Max DIMM capacity	8 GB	8 GB	8 GB	16 GB	16 GB	16 GB
Max memory capacity	192 GB	192 GB	192 GB	384 GB	384 GB	384 GB
Max. memory at rated speed	None	128 GB	64 GB	None	256 GB	128 GB
Maximum operating speed						
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz	1600 MHz	1866 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1600 MHz	1333 MHz	1600 MHz	1600 MHz
3 DIMMs per channel	800 MHz	1066 MHz	1066 MHz	800 MHz	1066 MHz	1066 MHz

* The maximum quantity that is supported is shown for two processors installed.

Table 5. Maximum memory speeds (Part 2: Intel Xeon processor E5-2600 v2 product family - UDIMMs, LRDIMMs, and HyperCloud DIMMs)

DIMM specification	UDIMM		LRDIMM	HyperCloud DIMM
Rank	Dual rank		Quad rank	Quad rank
Part number	00D5016 (8 GB)		46W0761 (32 GB)*	46W0767 (32 GB)*
Rated speed	1600 MHz		1866 MHz	1333 MHz
Rated voltage	1.35 V		1.5 V	1.5 V
Operating voltage	1.35 V	1.5 V	1.5 V	1.5 V
Max. qty supported**	16	16	24	24
Max. DIMM capacity	8 GB	8 GB	32 GB	32 GB
Max. memory capacity	128 GB	128 GB	768 GB	768 GB
Max. memory at rated speed	None	128 GB	256 GB	768 GB
Maximum operating speed				
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1600 MHz	1333 MHz
3 DIMMs per channel	No support	No support	1066 MHz	1333 MHz

* Support is planned for later in 2013.
** Maximum quantity supported is shown for two processors installed.

Table 5. Maximum memory speeds (Part 3: Intel Xeon processor E5-2600 product family - RDIMMs)

DIMM specification	RDIMM							
Rank	Single rank			Dual rank			Quad rank	
Part numbers	49Y1405 (2GB) 49Y1406 (4GB)		49Y1559 (4GB)	49Y1407 (4GB) 49Y1397 (8GB) 49Y1563 (16GB)		90Y3178 (4GB) 90Y3109 (8GB) 00D4968 (16GB)	49Y1399 (8GB)	
Rated speed	1333 MHz		1600 MHz	1333 MHz		1600 MHz	1066 MHz	
Rated voltage	1.35 V		1.5 V	1.35 V		1.5 V	1.35 V	
Operating voltage	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V
Max qty supported*	16	24	24	16	24	24	16	16
Max DIMM capacity	4 GB	4 GB	4 GB	16 GB	16 GB	16 GB	8 GB	8 GB
Max memory capacity	64 GB	96 GB	96 GB	256 GB	384 GB	384 GB	128 GB	128 GB
Max. memory at rated speed	64 GB	64 GB	64 GB	256 GB	256 GB	256 GB	128 GB	64 GB
Maximum operating speed								
1 DIMM per channel	1333 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz	1600 MHz	800 MHz	1066 MHz
2 DIMMs per channel	1333 MHz	1333 MHz	1600 MHz	1333 MHz	1333 MHz	1600 MHz	800 MHz	800 MHz
3 DIMMs per channel	No support	1066 MHz	1066 MHz	No support	1066 MHz	1066 MHz	No support	No support

* Maximum quantity supported is shown for two processors installed.

Table 5. Maximum memory speeds (Part 2: Intel Xeon processor E5-2600 product family - UDIMMs, HyperCloud DIMMs, and LRDIMMs)

DIMM specification	UDIMM		HyperCloud DIMM		LRDIMM	
Rank	Dual rank		Dual rank		Quad rank	
Part number	49Y1404 (4 GB)		00D5004 (32 GB)	00D4964 (16 GB) 46W0767 (32 GB)**	90Y3105 (32 GB)	
Rated speed	1333 MHz		1066 MHz	1333 MHz	1333 MHz	
Rated voltage	1.35 V		1.5 V	1.5 V	1.35 V	
Operating voltage	1.35 V	1.5 V	1.5 V	1.5 V	1.35 V	1.5 V
Max. qty supported*	16	16	24	24	24	24
Max. DIMM capacity	4 GB	4 GB	32 GB	16 GB	32 GB	32 GB
Max. memory capacity	64 GB	64 GB	768 GB	384 GB	768 GB	768 GB
Max. memory at rated speed	32 GB	64 GB	768 GB	384 GB	256 GB	512 GB
Maximum operating speed						
1 DIMM per channel	1333 MHz	1333 MHz	1066 MHz	1333 MHz	1333 MHz	1333 MHz
2 DIMMs per channel	1066 MHz	1333 MHz	1066 MHz	1333 MHz	1066 MHz	1333 MHz
3 DIMMs per channel	No support	No support	1066 MHz	1333 MHz	1066 MHz	1066 MHz

* Maximum quantity supported is shown for two processors installed. When one processor is installed, the maximum quantity supported is a half of the quantity that is shown.
** Support is planned for later in 2013.

The following memory protection technologies are supported:

- ECC
- Chipkill (for x4-based memory DIMMs)
- Memory mirroring
- Memory rank sparing

If memory mirroring is used, DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type and size.

If memory rank sparing is used, then a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need being identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs installed.

The following table lists the memory options that are available for x3650 M4 server.

Table 6. Memory options (Part 1: Intel Xeon processor E5-2600 v2 product family)

Part number	Feature code	Description	Maximum supported	Standard models where used
UDIMMs				
00D5016	A3QC	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	16 (8 per CPU)	-
RDIMMs - 1600 MHz				
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	A3x, B3x
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	C3x, C5x, D3x, F3x
00D5044	A3QK	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	53x
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
RDIMMs - 1866 MHz				
00D5020	A3QD	4GB (1x4GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
00D5032	A3QG	8GB (1x8GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	23x, 33x, 43x, 73x, 83x, G3x, H3x, J3x, L3x, M3x
00D5048	A3QL	16GB (1x16GB, 2Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
LRDIMMs (support is planned for later in 2013)				
46W0761	A47K	32GB (1x32GB, 4Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP LRDIMM	24 (12 per CPU)	-
HyperCloud DIMMs (support is planned for later in 2013)				
46W0767	A4RE	32GB (1x32GB,1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP HyperCloud DIMM	24 (12 per CPU)	-

Table 6. Memory options (Part 2: Intel Xeon processor E5-2600 product family)

Part number	Feature code	Description	Maximum supported	Standard models where used
UDIMMs				
49Y1404	8648	4 GB (1x 4 GB, 2Rx8, 1.35 V) PC3L-10600 CL9 ECC 1333 MHz LP UDIMM	16 (8 per CPU)	-
RDIMMs - 1333 MHz and 1066 MHz				
49Y1405	8940	2 GB (1x 2 GB, 1Rx8, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMM	24 (12 per CPU)	-
49Y1406	8941	4 GB (1x 4 GB, 1Rx4, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMM	24 (12 per CPU)	A2x, B2x
49Y1407	8942	4 GB (1x 4 GB, 2Rx8, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMM	24 (12 per CPU)	-
49Y1397	8923	8 GB (1x 8 GB, 2Rx4, 1.35 V) PC3L-10600 CL9 ECC 1333 MHz LP RDIMM	24 (12 per CPU)	C2x, C4x, D2x, F2x
49Y1399	A14E	8 GB (1x 8 GB, 4Rx8, 1.35 V) PC3L-8500 CL7 ECC DDR3 1066 MHz LP RDIMM	16 (8 per CPU)	-
49Y1563	A1QT	16 GB (1x 16 GB, 2Rx4, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMM	24 (12 per CPU)	-
RDIMMs - 1600 MHz				
49Y1559	A28Z	4 GB (1x 4 GB, 1Rx4, 1.5 V) PC3-12800 CL11 ECC DDR3 1600 MHz LP RDIMM	24 (12 per CPU)	32x, M2x
90Y3178	A24L	4 GB (1x4GB, 2Rx8, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
90Y3109	A292	8 GB (1x 8 GB, 2Rx4,1.5 V) PC3-12800 DDR3-1600 LP RDIMM	24 (12 per CPU)	52x, 62x, G2x, H2x, J2x, L2x, GSx
00D4968	A2U5	16 GB (1x16GB, 2Rx4, 1.5V) PC3-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
LRDIMMs				
90Y3105	A291	32 GB (1x32 GB, 4Rx4, 1.35 V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP LRDIMM	24 (12 per CPU)	-
HyperCloud DIMMs				
00D4964	A2R1	16 GB (1x 16 GB, 2Rx4, 1.5 V) PC3-10600 1333 MHz LP HyperCloud DIMM	24 (12 per CPU)	-
00D5004	A3EJ	32 GB (1x32GB, 1.5V) PC3-8500 CL7 ECC DDR3 1066MHz LP HyperCloud DIMM	24 (12 per CPU)	-
46W0767 *	A4RE	32GB (1x32GB,1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP HyperCloud DIMM	24 (12 per CPU)	-

* Support is planned for later in 2013.

Internal disk storage options

IBM System x3650 M4 server supports 1.8-inch solid-state drives (SSDs), 2.5-inch SSDs and HDDs, and 3.5-inch HDDs. The server supports the following configurations:

1. 16x 2.5-inch hot-swap drive bays, either with or without a SAS expander
2. 8x 2.5-inch hot-swap drive bays
3. 6x 3.5-inch hot-swap hard drive bays
4. 8x 2.5-inch hot-swap drive bays + 16x 1.8-inch SSD drive bays
5. 8x 2.5-inch simple swap drive bays (only available in CTO)
6. 32x 1.8-inch SSD drive bays (only available in CTO)
7. 6x 3.5-inch simple-swap SATA hard drive bays (only available in CTO)

The following figure shows the first three of these configurations.

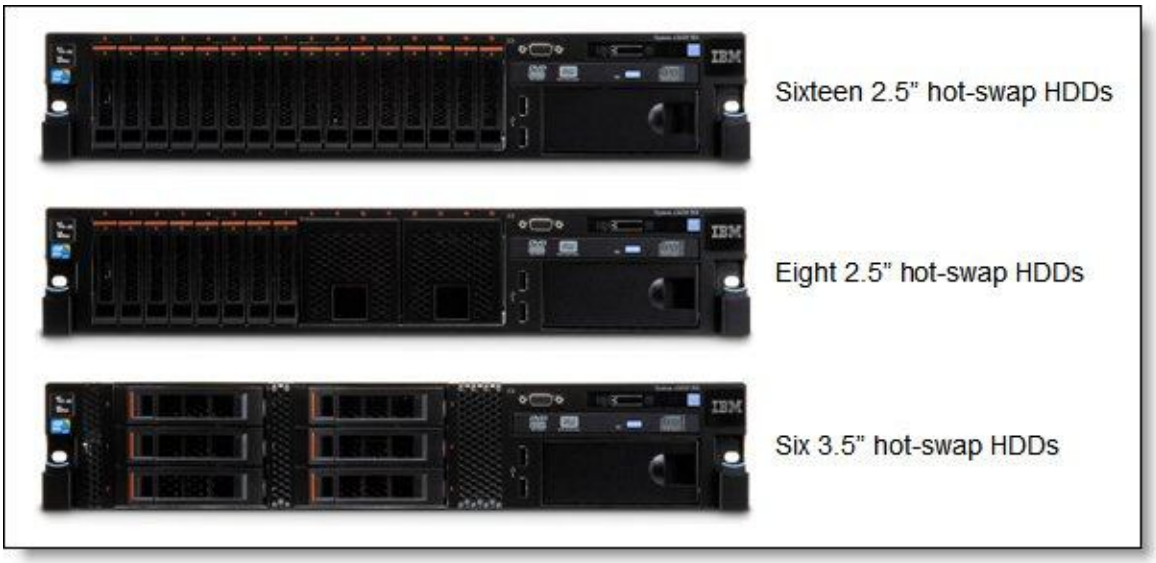

Figure 5. Internal drive configurations (3 of 6 configurations shown)

Backplanes and enablement kits

All standard models, except models C4x and C5x, ship with eight 2.5" Slim-SFF SAS/SATA hot-swap hard drive bays. Models C4x and C5x ship with six 3.5" SAS/SATA hot-swap hard drive bays.

The following table shows the internal storage expansion options that are available for x3650 M4 server.

Table 7. Internal storage expansion options (Part 1)

Part number	Feature code	Name and description	Maximum supported
6 Gb SAS/SATA			
69Y5319	A1JY	x3650 M4 Plus 8x 2.5" HS HDD Assembly Kit with Expander ● For models with eight 2.5-inch hot-swap bays, adds eight more bays for a total of 16 2.5-inch hot-swap HDD bays. ● This option includes a SAS expander card that is mounted on an HDD backplane, and it does not consume a PCIe slot. ● Includes internal cables.	1
00D9490	A39W	x3650 M4 Plus 8 2.5" HS HDD Assembly Option Kit ● For models with eight 2.5-inch hot-swap bays, adds eight more bays for a total of 16 2.5-inch hot-swap HDD bays. ● Does not include a SAS expander. ● Requires a second RAID adapter for the second set of eight drives. ● Includes internal cables.	1
00D9493	A39Z	x3650 M4 8 2.5" Plus 16 1.8" SSD Assembly Option Kit ● For models with eight 2.5-inch hot-swap bays, adds 16 1.8-inch SSD bays for a total of 24 bays. ● Requires two SSD controllers for the 16 SSDs. ● Includes internal cables.	1
None*	A39X	x3650 M4 Hot-Swap 16/32 HDD Assembly Kit ● For CTO only. First set of 16 1.8-inch SSD bays.	1
00D9492	A39Y	x3650 M4 16 Plus 16 1.8" SSD Assembly Option Kit ● For CTO only. Second set of 16 1.8-inch SSD bays. ● Use with feature A39X to configure a total of 32 1.8-inch SSD bays.	1
None*	A3A0	x3650 M4 2.5" Simple Swap Kit ● For CTO only ● Supports eight simple-swap drives ● No support for 16 simple-swap drives	1
69Y5320	A1L6	x3650 M4 Tape Enablement Kit ● Adds support for an internal tape drive (DDS5, DDS6, or RDX). ● This option includes two USB cables (one for DDS tape and one for RDX tape). ● The tape drive is ordered separately.	1

Table 7. Internal storage expansion options (Part 2)

12 Gb SAS/SATA (Support is planned for later in 2013)			
None*	A460	x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID ● For CTO only. First set of eight 2.5-inch hot-swap bays for 12 Gb drive connectivity. ● Requires either one M5210 or one N2215.	1
00Y7627	A461	x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID ● For models with eight 12 Gb 2.5-inch hot-swap bays, adds eight more 12 Gb bays for a total of 16 2.5-inch hot-swap HDD bays. ● This option includes a SAS expander card that is mounted on an HDD backplane, and it does not consume a PCIe slot. ● Includes internal cables. ● Requires either one M5210 or one N2215.	1
00Y7626	A462	x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID ● For models with eight 6 Gb 2.5-inch hot-swap bays, adds eight 12 Gb bays for a total of 16 2.5-inch hot-swap HDD bays. ● Does not include a SAS expander. (Eight 6 Gb bays are connected to the integrated M5110e.) ● Includes internal cables. ● Requires either one M5210 or one N2215. (Eight 12 Gb bays are connected to the M5210 or N2215.)	1

* These configurations are only available via CTO and special bid.

Use the following table to determine what backplane kits you need.

Table 8. Drive combinations

Drive combination	Configure these kits	Controllers needed
Hot-swap drives - 6 Gb		
6x 3.5-inch hot-swap drives	• x3650 M4 3.5" HS HDD Assembly Kit, feature A1JV (standard in model C4x, or CTO)	Onboard
8x 2.5-inch hot-swap drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x)	Onboard
16x 2.5-inch hot-swap drives with a SAS expander	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 Plus 8x 2.5" HS HDD Assembly Kit with Expander, part 69Y5319, feature A1JY	Onboard
16x 2.5-inch hot-swap drives without a SAS expander	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 Plus 8 2.5" HS HDD Assembly Option Kit, part 00D9490, feature A39W	Onboard + 1x adapter
8x 2.5-inch drives + 16x 1.8-inch drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650 M4 8 2.5" Plus 16 1.8" SSD Assembly Option Kit, part 00D9493, feature A39Z	Onboard + 2x adapters
16x 1.8-inch drives (CTO only)	• x3650 M4 Hot-Swap 16/32 HDD Assembly Kit, feature A39X	2x adapters
32x 1.8-inch drives (CTO only)	• x3650 M4 Hot-Swap 16/32 HDD Assembly Kit, feature A39X • x3650 M4 16 Plus 16 1.8" SSD Assembly Option Kit, part 00D9492, feature A39Y	4x adapters
Hot-swap drives - 12 Gb (support is planned for later in 2013)		
8x 2.5-inch hot-swap drives	• x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID, feature A460 (CTO only)	1x 12 Gb adapter
16x 2.5-inch hot-swap drives with a SAS expander	• x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID, feature A460 (CTO only) • x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID, part number 00Y7627	1x 12 Gb adapter
8x 2.5-inch 6 Gb drives + 8x 2.5-inch 12 Gb drives	• x3650 M4 8x 2.5" HS HDD Assembly Kit, feature A1JX (standard in all models except C4x and C5x) • x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID, part number 00Y7626	Onboard + 1x 12 Gb adapter
Simple-swap drives		
6x 3.5-inch simple-swap drives (CTO only)	• x3650 M4 3.5" SS HDD Assembly Kit, feature A1JW (CTO only)	Onboard
8x 2.5-inch simple-swap drives (CTO only)	• x3650 M4 2.5" Simple Swap Kit, feature A3A0 (CTO only)	Onboard
Tape drive option		
Add an internal tape drive to any of the above	• x3650 M4 Tape Enablement Kit, part 69Y5320, feature A1L6	None

RAID controllers

The following table lists the RAID controllers and additional options used for internal disk storage of x3650 M4 server.

Table 9. RAID controllers and HBAs for internal storage (Part 1: 6 Gbps SAS)

Part number	Feature code	Description	Maximum supported	Standard models where used
Integrated	None	ServeRAID M5110e SAS/SATA Controller	1	All models
81Y4481	A347	ServeRAID M5110 SAS/SATA Controller	3	-
46M0912	3876	IBM 6Gb Performance Optimized HBA	4	-
46C8988	A3MW	N2115 SAS/SATA HBA for IBM System x	4	-
Hardware upgrades for the M5110 and M5110e				
81Y4508	A22E	ServeRAID M5100 Series Battery Kit	1*	-
90Y5046	A2BB	x3650 M4 Remote Supercap and Battery Tray**	1	-
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	1	-
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	1	D2x, F2x, 52x, 62x, D3x, F3x
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	1	G2x, H2x, J2x, L2x, GSx, 53x, 73x, 83x, G3x, H3x, J3x, L3x
Feature on Demand upgrades for the M5110 and M5110e				
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade	1	-
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler	1	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key	1	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade	1†	-

* The ServeRAID M5100 Series Battery Kit (81Y4508) is only supported with ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade (81Y4484).
† The ServeRAID M5100 Series RAID 6 Upgrade (81Y4546) requires 512 MB or 1 GB cache upgrades.
** Cannot be installed if an internal tape drive is installed

Table 9. RAID controllers and HBAs for internal storage (Part 2: 12 Gbps SAS) (Support is planned for later in 2013)

Part number	Feature code	Description	Maximum supported	Standard models where used
46C9110	A3YZ	ServeRAID M5210 SAS/SATA Controller	1	-
47C8675	A3YY	N2215 SAS/SATA HBA for IBM System x	1	-
Hardware upgrades for the M5210				
47C8656	A3Z0	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	1	-
47C8660	A3Z1	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	1	-
47C8664	A3Z2	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5210				
47C8708	A3Z6	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade	1	-
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade	1*	-
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator	1*	-
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler	1*	-

* Requires cache memory upgrade (47C8656, 47C8660, or 47C8664).

The integrated ServeRAID M5110e SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache
- Up to 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

The ServeRAID M5110 SAS/SATA Controller has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache
- Up to 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller

The ServeRAID M5210 SAS/SATA Controller has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5200 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports 1 GB non-backed cache or 1 GB or 2 GB flash-backed cache
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller

The IBM 6Gb Performance Optimized HBA has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 6 Gbps throughput per port
- PCIe 2.0 x8 host interface
- Based on the LSI SAS2008 6 Gbps controller

The IBM N2115 SAS/SATA HBA has the following specifications:

- Eight internal 6 Gbps SAS/SATA ports
- Two x4 mini-SAS internal connectors (SFF-8087)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 6 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS2308 6 Gbps controller

The IBM N2215 SAS/SATA HBA has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 HD mini-SAS internal connectors (SFF-8643)
- Supports connections to SAS/SATA HDDs and SATA SSDs
- Optimized for SSD performance
- No RAID support
- Up to 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3008 12 Gbps controller

For more information, see the list of IBM Redbooks Product Guides in the RAID adapters category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=raid

The following table lists hard drive options for the internal disk storage of the x3650 M4 server.

Table 10. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description	Maximum supported
1.8" solid-state drives (SSDs) - Enterprise			
41Y8371	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	32
41Y8366	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	32
43W7726	5428	IBM 50GB SATA 1.8" MLC SSD	32
43W7746	5420	IBM 200GB SATA 1.8" MLC SSD	32
00W1120	A3HQ	IBM 100GB SATA 1.8" MLC Enterprise SSD	32
49Y6119	A3AN	IBM 200GB SATA 1.8" MLC Enterprise SSD	32
49Y6124	A3AP	IBM 400GB SATA 1.8" MLC Enterprise SSD	32
1.8" solid-state drives (SSDs) - Enterprise Value			
49Y5993	A3AR	IBM 512GB SATA 1.8" MLC Enterprise Value SSD	32
49Y5834	A3AQ	IBM 64GB SATA 1.8" MLC Enterprise Value SSD	32
2.5" solid-state drives (SSDs) - hot-swap - Enterprise			
41Y8341	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8336	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8331	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	16
49Y6139	A3F0	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6134	A3EY	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6129	A3EW	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	16
43W7718	A2FN	IBM 200GB SATA 2.5" MLC HS SSD	16
2.5" solid-state drives (SSDs) - hot-swap - Enterprise Value			
90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	16
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5844	A3AU	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5839	A3AS	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	16
2.5" solid-state drives (SSDs) - simple-swap			
43W7742	5419	IBM 200GB SATA 2.5" MLC SS SSD	16
90Y8668	A2UB	IBM 128GB SATA 2.5" MLC SS Enterprise Value SSD	16
90Y8663	A2UC	IBM 256GB SATA 2.5" MLC SS Enterprise Value SSD	16

Table 10. Disk drive options for internal disk storage (Part 2)

Part number	Feature code	Description	Maximum supported
2.5" NL SAS Hot-Swap HDDs			
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	16
81Y9730	A1AV	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	16
81Y9726	A1NZ	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
42D0752	5407	IBM 500GB 7200 NL SATA 2.5" SFF Slim-HS HDD	16
81Y9722	A1NX	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
2.5" 15K SAS Hot-Swap HDDs			
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	16
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	16
90Y8944	A2ZK	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	16
2.5" 10K SAS Hot-Swap HDDs			
00AD075**	A48S	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	16
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	16
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
2.5" 10K SAS Hot-Swap Self-encrypting drives (SEDs)			
00AD085**	A48T	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS SED	16
81Y9662	A3EG	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
90Y8908	A3EF	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
90Y8913	A2XF	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
2.5" SAS-SSD Hybrid Drive			
00AD102	A4G7	IBM 600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	16
3.5" NL SAS Hot-Swap HDDs			
90Y8577	A2R2	IBM 3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6
90Y8572	A2U0	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6
90Y8567	A26M	IBM 1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	6

Table 10. Disk drive options for internal disk storage (Part 3)

Part number	Feature code	Description	Maximum supported
3.5" NL SATA Hot-swap HDDs			
49Y6002	A3W9	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9798	A22S	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9794	A22T	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9790	A22P	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
81Y9786	A22Y	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	6
3.5" NL SATA Simple-swap HDDs*			
49Y6012*	A3WA	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9814*	A22V	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9810*	A22W	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9806*	A22X	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
81Y9802*	A22U	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	6
3.5" SAS Hot-Swap HDDs			
49Y6102	A3DX	IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	6
49Y6097	A3DW	IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	6
49Y6092	A3DV	IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	6

* Simple swap drives are for use in a configuration that is only available via special bid or the Configure To Order (CTO) process.
** Not supported in E5-2600 v2 processor-based models.

Internal backup units

The server supports the internal tape drive options listed in the following table. The x3650 M4 Tape Enablement Kit (69Y5320) is required to support these tapes internally.

Table 11. Internal tape drives

Part number	Feature code	Description	Maximum supported
00D2786	A2VE	IBM RDX Internal USB 3.0 Dock with 320GB Cartridge	1
00D2787	A2VF	IBM RDX Internal USB 3.0 Dock with 500GB Cartridge	1
00D2788	A2VG	IBM RDX Internal USB 3.0 Dock with 1TB Cartridge	1
36251TY	None	IBM RDX USB 3.0 Dock with 1TB Cartridge	1
362532Y	None	IBM RDX USB 3.0 Dock with 320GB Cartridge	1
362550Y	None	IBM RDX USB 3.0 Dock with 500GB Cartridge	1
46C5399	5711	IBM DDS Generation 5 USB Tape Drive	1
39M5636	5395	IBM DDS Generation 6 USB Tape Drive	1

For more information, see the list of IBM Redbooks Product Guides in the Backup units category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape

Optical drives

The server supports the optical drive options listed in the following table.

Table 12. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0901	4161	IBM UltraSlim Enhanced SATA DVD-ROM	1	-
46M0902	4163	UltraSlim Enhanced SATA Multi-Burner	1	-

IBM UltraSlim Enhanced SATA DVD-ROM (part number 46M0901) supports the following media and speeds for reading:

- CD-ROM 24X
- CD-DA (DAE) 20X
- CD-R 24X
- CD-RW 24X
- DVD-ROM (single layer) 8X
- DVD-ROM (dual layer) 8X
- DVD-R (4.7 GB) 6X
- DVD-R DL 4X
- DVD+R 6X
- DVD+R DL 4X
- DVD-RW (4.7 GB) 4X
- DVD+RW 4X
- DVD-RAM (4.7/9.4 GB) 4X

IBM UltraSlim Enhanced SATA Multi-Burner (46M0902) supports the same media and speeds for reading as DVD-ROM (46M0901). This drive also supports the following media and speeds for writing:

- CD-R 24X
- CD-RW 4X
- High Speed CD-RW 10X
- Ultra Speed CD-RW 16X
- Ultra Speed Plus CD-RW 16X
- DVD-R 8X
- DVD-R DL 6X
- DVD+R 8X
- DVD+R DL 6X
- DVD-RW 6X
- DVD+RW 8X
- DVD-RAM 5X

I/O expansion options

The server supports up to six PCIe slots with different riser cards installed into two riser sockets on the system planar (one riser socket supports installation of one riser card). Riser 1 supplies slots 1, 2, and 3. Riser 2 supplies slots 4, 5, and 6. Standard models have Riser card 1 installed with three PCIe 3.0 x8 slots. To enable slots 4 - 6, install a second processor and a second riser card.

The following table lists the PCI riser card options available.

Table 13. PCI riser card options

Part number	Feature code	Description	Maximum supported
69Y5321	A1JU	x3650 M4 PCIe Riser Card (3 x8 PCIe slots) (one included in standard models in Riser socket 1)	2
69Y5322	A1JQ	x3650 M4 PCIe Riser Card (1 x16 + 1 x8 PCIe slots)	2
81Y6843	A1JS	x3650 M4 PCIX Riser Card (2 PCIX + 1 x16 PCIe slots)	2
90Y5085	A3A1 / A3L2*	x3650 M4 PCIe Riser Card 2 (1 x16 for GPU + 1 x8 FH/HL Slots)	2

* For CTO orders, order A3L2 for the first riser slot and A3A1 for the second riser slot

The locations of the PCIe slots are shown in the following figure.

Figure 6. Slot dimensions

The specific slots that are available depend on the riser cards installed in Riser socket 1 and Riser socket 2, as shown in the following table. Standard models have 69Y5321 installed in Riser socket 1.

Tip: All slots support full-height adapters. Slots 1, 4, and 5 support full-length adapters, whereas slots 2, 3, and 6 (when present) support half-length adapters.

Table 14. PCIe slot descriptions (FH=full height, FL=full length, HL=half length, DW=double width)

Slot number	PCIe 3 x8 riser 69Y5321 (standard)	PCIe x16 riser 69Y5322	PCI-X riser 81Y6843	GPU riser 90Y5085
Riser socket 1 (CPU 1)	1: PCIe 3.0 x8; FH, FL	1: PCIe 3.0 x16 FH, FL	1: PCI-X 64b/133 FH, FL	1: No slot present
	2: PCIe 3.0 x8; FH, HL	2: PCIe 3.0 x8 FH, HL	2: PCI-X 64b/133 FH, HL	2: PCIe 3.0 x16 FH, FL, DW
	3: PCIe 3.0 x8; FH, HL	3: No slot present	3: PCIe 3.0 x16 FH, HL	3: PCIe 3.0 x8 FH, HL
Riser socket 2 (CPU 2 required)	4 :PCIe 3.0 x8 FH, FL	4: PCIe 3.0 x16 FH, FL	4: PCI-X 64b/133 FH, FL	4: No slot present
	5: PCIe 3.0 x8 FH, FL	5: PCIe 3.0 x8 FH, FL	5: PCI-X 64b/133 FH, FL	5: PCIe 3.0 x16 FH, FL, DW
	6: PCIe 3.0 x8 FH, HL	6: No slot present	6: PCIe 3.0 x16 FH, HL	6: PCIe 3.0 x8 FH, HL

Note: Slots 4, 5, and 6 require a second processor to be installed.

The x3650 M4 Thermal Solution Kit, 46W8422 contains an 80mm fan which provides the fourth system fan needed for the QLogic Dual Port 10GbE SFP+ Embedded VFA for IBM System x when only one processor is installed. The Thermal Solution Kit is not needed if two processors are installed, since the second processor includes this fan.

Table 15. Thermal Solution Kit

Part number	Feature code	Description	Maximum supported
46W8422	A499*	x3650 M4 Thermal Solution Kit	1

* For CTO orders, feature code A3ZE, IBM System x3650 M4 Fan Assembling Kit will be substituted

Network adapters

x3650 M4 supports four integrated Gigabit Ethernet ports. Optionally, two 10 Gb Ethernet ports can be added by installing one of the available dual-port 10 Gb Ethernet mezzanine cards listed in the following table. These cards use a dedicated connector on the motherboard and do not consume a PCI expansion slot.

Integrated NICs have the following features:

- Intel I350AM4 chip
- Four GbE ports
- TCP Offload Engine (TOE) support
- Wake on LAN support
- 802.1Q VLAN tagging support
- NIC Teaming (load balancing and failover)

The following table lists additional supported network adapters.

Table 16. Network adapters (Part 1)

Part number	Feature code	Description	Maximum supported#
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	6
10 Gb Ethernet (Mezzanine Card - does not consume a PCI expansion slot)			
90Y6454*	A22H	QLogic Dual Port 10GbE SFP+ Embedded VFA for IBM System x	1*
90Y5179	A2TF	QLogic Embedded VFA FCoE/iSCSI License for IBM System x (FoD) (Features on Demand Upgrade for 90Y6454)	1
90Y6456**	A22J	Emulex Dual Port 10GbE SFP+ Embedded VFA III for IBM System x	1
90Y5178**	A2TE	Emulex Embedded VFA III FCoE/iSCSI License for IBM System x (Features on Demand Upgrade for 90Y6456)	1
49Y7980	A3JS	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter for IBM System x	1

Table 16. Network adapters (Part 2)

Part number	Feature code	Description	Maximum supported#
10 Gb Ethernet			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for IBM System x	6
95Y3762**	A2U1	Emulex Dual Port 10GbE SFP+ VFA III for IBM System x	6
95Y3760**	A2U2	Emulex VFA III FCoE/iSCSI License for IBM System x (Feature on Demand upgrade license for 95Y3762 -- one for each adapter)	6
00D9501	A3A2	IBM LLM-SM Dual Port 10GbE SFP+ Adapter for IBM System x	6
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	6
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	6
81Y9990**	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x	6
00W0053	A2ZQ	Mellanox ConnectX-3 EN Dual-port SFP+ 10GbE Adapter	6
00D9690	A3PM	Mellanox ConnectX-3 10GbE Adapter for IBM System x	6
47C9952	A47H	Solarflare SFN5162F MR Dual Port 10GbE SFP+ Adapter	6
47C9960	A47J	Solarflare SFN6122F LL Dual Port 10GbE SFP+ Adapter	6
Converged Network Adapters (CNA)			
42C1800	5751	QLogic 10 Gb Dual Port CNA for IBM System x	6
42C1820	1637	Brocade 10 Gb Dual-port CNA for IBM System x	6
Gigabit Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	6
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	6
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	6
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	6
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter	6
49Y4220	5766	NetXtreme II 1000 Express Quad Port Ethernet Adapter	6
42C1750	2975	PRO/1000 PF Server Adapter	6
InfiniBand (Mezzanine Card - does not consume a PCI expansion slot)			
00D4143	A36R	IBM Dual Port FDR Embedded Adapter	1
InfiniBand			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	6

* The QLogic Dual Port 10GbE SFP+ Embedded VFA requires the x3650 M4 Thermal Solution Kit, 46W8422 or the second processor (with additional system fan).
# Maximum quantity is achieved with two processors installed. With one processor, the maximum quantity is half of the listed value (this does not apply to mezzanine cards).
** Not supported in E5-2600 v2 processor-based models.

For more information, see the list of IBM Redbooks Product Guides in the Networking adapters category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=networkadapters

Storage host bus adapters

The following table lists storage HBAs supported by x3650 M4 server. The maximum quantity listed is for configurations with two processors installed. If one processor is installed, the maximum quantity supported is half of the listed value.

Table 17. Storage adapters

Part number	Feature code	Description	Maximum supported
Fibre Channel - 16 Gb			
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	6
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	6
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	6
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	6
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	6
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	6
Fibre Channel - 8 Gb			
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x	6
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x	6
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x	6
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x	6
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x	6
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x	6
Fibre Channel - 4 Gb*			
42C2069	1698	Emulex 4 Gbps FC Single-Port PCI-e HBA for IBM System x	6
42C2071	1699	Emulex 4 Gbps FC Dual-Port PCI-e HBA for IBM System x	6
59Y1987	3885	Brocade 4 Gb FC Single-port HBA for IBM System x	6
59Y1993	3886	Brocade 4 Gb FC Dual-port HBA for IBM System x	6
39R6527	3568	QLogic 4Gb FC Dual-Port PCIe HBA for System x	6
39R6525	3567	QLogic 4Gb FC Single-Port PCIe HBA for System x	6
SAS			
46M0907	5982	IBM 6 Gb SAS HBA Controller	6
46C9010	A3MV	N2125 SAS/SATA HBA for IBM System x	6

* Not supported in E5-2600 v2 processor-based models.

For more information, see the list of IBM Redbooks Product Guides in the Host bus adapters category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=hba

PCIe SSD adapters

The server supports the High IOPS SSD adapters listed in the following table.

Table 18. SSD adapters

Part number	Feature code	Description	Maximum supported
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	6
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	6
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	6
90Y4361	A3MZ	IBM 300GB High IOPS MLC Modular Adapter	6
90Y4365	A3N0	IBM 600GB High IOPS MLC Modular Adapter	2
90Y4369	A3N1	IBM 800GB High IOPS MLC Modular Adapter	2
90Y4373	A3N2	IBM 300GB High IOPS SLC Modular Adapter	6

For details about these adapters, see the IBM Redbooks Product Guide *IBM High IOPS MLC Adapters*, found at the following address:
http://www.redbooks.ibm.com/abstracts/tips0907.html?Open

GPU adapters

The server supports graphics processing units (GPUs) provided riser card 90Y5085 is installed (one or two depending on the number of GPUs). The server provides up to 225W of external power to each GPU. The following table lists the supported GPUs.

Table 19. GPU adapters

Part number	Feature code	Description	Maximum supported
Intel Xeon processor E5-2600 v2 product family			
None*	A3WH	NVIDIA Quadro K600	4
None*	A3WJ	NVIDIA Quadro K2000	2
Intel Xeon processor E5-2600 product family			
81Y6399	A13K	NVIDIA Quadro 600	4
94Y5957	4798	NVIDIA Quadro 4000	2**
None*	A26Q	NVIDIA Quadro 6000	2*

* Available only via CTO or special bid.
** Configurations with two Quadro 4000 adapters are available only via CTO or special bid; certain CPU/memory limitations apply.

The following configuration rules apply if a GPU is installed:

- Configurations with one Quadro 4000 or any quantity of Quadro 6000 adapters are CTO only as they require additional power and cooling components

- If three or four Quadro 600 adapters are to be installed, then the second processor must be installed
- An air baffle kit and GPU AUX power cables may be required and will be included by the configurator as needed
- If the Quadro 600 is installed, the maximum memory that can be installed is 128 GB.
- If Quadro 2000, 4000 or 6000 are installed, a maximum of 16 LRDIMMs or HCDIMMs can be installed and the total memory installed cannot exceed 512 GB
- Further restrictions apply depending on the power supplies installed as described in the Power supplies section.

Power supplies

The server supports up to two redundant power supplies. Standard models come with one or two power supplies (model dependent). The following table lists the power supplies.

Table 20. Power supplies

Part number	Feature code	Description	Maximum supported	Standard models where used
94Y6668	A1H6	IBM System x 550W High Efficiency Platinum AC Power Supply	2	A2x, B2x, C2x, C4x, 52x, 53x, A3x, B3x, C3x, C5x, D3x, F3x
94Y6669	A1H5	IBM System x 750W High Efficiency Platinum AC Power Supply	2	D2x, F2x, G2x, H2x, J2x, 62x, GSx, G3x, H3x, J3x
94Y7631	A39N	IBM System x 750W High Efficiency -48 V DC Power Supply	2	-
94Y6667	A2EB	IBM System x 900W High Efficiency Platinum AC Power Supply	2	L2x, 32x, M2x, 23x, 33x, 43x, 73x, 83x, L3x, M3x

An AC power supply ships standard with one 2.8 m C13 - C14 power cord.

The use of certain power supply configurations imposes the limitations that are listed in the following table with the following color key:

- Green cells indicate no limitations
- Yellow cells indicate some limitation
- Grey cells indicate no support

Table 21. Configuration limitations based on power supply used (PSU = power supply unit)

Power supply	PSU qty	PSU red*	Maximum GPU installed**	CPU support	Memory support	PCIe adapters (non GPU)	Max 2.5" drives
550 W	1	No	None installed	Max 115W	8x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	16
	2	No	1x Q6000, or 1x Q4000, or 2x Q2000, or 4x Q600, or 1x K5000, or 2x K2000, or 4x K600	No limitation	No limitation	No limitation	No limitation
		Yes	None installed	Max 115W	8x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	16
750 W	1	No	None installed	No limitation	No QR RDIMMs No LRDIMMs No HCDIMMs	4	No limitation
			1x Q6000, or 1x Q4000, or 2x Q2000, or 4x Q600, or 1x K5000, or 2x K2000, or 4x K600	Max 115W	16x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	8
	2	No	No limitation	No limitation	No limitation	No limitation	No limitation
		Yes	None installed	No limitation	No QR RDIMMs No LRDIMMs No HCDIMMs	4	No limitation
			1x Q6000, or 1x Q4000, or 2x Q2000, or 4x Q600, or 1x K5000, or 2x K2000, or 4x K600	Max 115W	16x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	8
900 W	1	No	None installed	No limitation	No limitation	No limitation	No limitation
			1x Q6000, or 1x Q4000, or 2x Q2000, or 4x Q600, or 1x K5000, or 2x K2000, or 4x K600	No limitation	No QR RDIMMs No LRDIMMs No HCDIMMs	2	No limitation
			1x Tesla K20	No limitation	16x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	12
	2	No	No limitations	No limitation	No limitation	No limitation	No limitation
		Yes	None installed	No limitation	No limitation	No limitation	No limitation
			1x Q6000, or 1x Q4000, or 2x Q2000, or 4x Q600, or 1x K5000, or 2x K2000, or 4x K600	No limitation	No QR RDIMMs No LRDIMMs No HCDIMMs	2	No limitation
			1x Tesla K20	No limitation	16x DIMMs max No QR RDIMMs No LRDIMMs No HCDIMMs	2	12

* Power supply unit redundancy
** For GPU configurations, see the additional rules in the GPU adapter section.

Integrated virtualization

The server supports VMware ESXi installed on a USB memory key. The key is installed in a USB socket inside the server. The following table lists the virtualization options.

Table 22. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8300	A2VC	IBM USB Memory Key for VMware vSphere 5.0	1
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update 1	1
41Y8311	A2R3	IBM USB Memory Key for VMware ESXi 5.1	1

Systems management

The server contains IBM Integrated Management Module II (IMM2), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM2 also provides a virtual presence capability for remote server management capabilities.

The IMM provides remote server management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The optional IBM Integrated Management Module Advanced Upgrade is required to enable the remote presence and blue-screen capture features. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel colors, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating-system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition. The following table lists the remote management option.

Table 23. Remote management option

Part number	Feature code	Description	Maximum supported	Models where used
90Y3901	A1ML	IBM Integrated Management Module Advanced Upgrade	1	-

All standard models ship with a pop-out light path diagnostics panel on the front of the server (See Figure 2). Configure-to-order (CTO) customers may elect to deselect this feature and instead have a basic light path diagnostics panel on the front of the server. The following table shows the two light path diagnostics features

Table 24. Light path diagnostics options

Part number	Feature code	Description	Maximum supported	Models where used
None*	A1LF	IBM System x Lightpath Kit	1	-
00Y7676	A2U6	IBM System x Advanced Lightpath Kit	1	All models

* CTO only

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2 (support is planned for earlier in 2014)
- Microsoft Windows Small Business Server 2008 Premium Edition*
- Microsoft Windows Small Business Server 2008 Standard Edition*
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- Solaris 10 Operating System*
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1*
- VMware ESXi 4.1*
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)

* Not supported with E5-2600 v2 processor-based server models.

See the IBM ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

Physical and electrical specifications

Dimensions and weight:

- Height: 86.5 mm (3.4 in)
- Width: 445 mm (17.5 in)
- Depth: 746 mm (29.4 in)
- Weight:
  - Minimum configuration: 25 kg (55 lb)
  - Maximum configuration: 30 kg (65 lb)

Supported environment:

- Air temperature:
  - Server on: 5 C to 40 C (41.0 F to 104 F); altitude: 0 to 915 m (3,000 ft) for 60W to 95W processor models.
  - Server on: 10 C to 35 C (50.0 F to 95 F); altitude: 0 to 915 m (3,000 ft) for 115W to 135W processor models.
  - Server off: 5 C to 45 C (41.0 F to 113 F)
  - Shipment: -40 C to +60 C (-40 F to 140 F)
- Humidity:
  - For 115W to 130W processors/135W processor models:
    - Server on: 20% to 80%, maximum dew point 21 C, maximum rate of change 5 C/hr
    - Server off: 8% to 80%, maximum dew point 27 C
  - For 60W to 95W processor models:
    - Server on: 8% to 85%, maximum dew point 24 C, maximum rate of change 5 C/hr
    - Server off: 8% to 80%, maximum dew point 27 C
- Electrical:
  - Models with 900 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 10 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 5 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.15 kVA
      - Maximum configuration: 1.02 kVA
  - Models with 750 W ac power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 8.9 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 4.5 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.15 kVA
      - Maximum configuration: 0.9 kVA
  - Models with 550 W power supplies:
    - 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 6.5 A
    - 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.3 A
    - Input kilovolt-amperes (kVA) (approximately):
      - Minimum configuration: 0.16 kVA
      - Maximum configuration: 0.66 kVA

- BTU output:
  - Minimum configuration: 525 Btu/hr (123 watts)
  - Maximum configuration: 3480 Btu/hr (1020 watts)
- Noise level:
  - 6.6 bels (operating)
  - 6.4 bels (idle)

Warranty options

The IBM System x3650 M4 has a three-year on-site warranty with 9x5/next business day terms. IBM offers the warranty service upgrades through IBM ServicePacs, discussed in this section. The IBM ServicePac is a series of prepackaged warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

IBM ServicePac offerings are country-specific, that is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePacs might be available in a particular country. For more information about the IBM ServicePac offerings that are available in your country, visit the IBM ServicePac Product Selector:

https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains warranty service definitions in more detail.

Table 25. Warranty service definitions

Term	Description
IBM on-site repair (IOR)	A service technician will come to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at your customer’s location within two hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at your customer’s location within four hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at your customer’s location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m., it is determined that on-site service is required, the customer can expect the service technician to arrive the morning of the following business day. For noncritical service requests, a service technician will arrive by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at your customer’s location on the business day after we receive your call, following remote problem determination. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the types of IBM ServicePacs are as follows:

- Warranty and maintenance service upgrades:
  - One, 2, 3, 4, or 5 years of 9x5 or 24x7 service coverage
  - On-site repair from next business day to 4 or 2 hours
  - One or two years of warranty extension
- Remote technical support services:
  - One or three years with 24x7 coverage (severity 1) or 9x5/next business day for all severities
  - Installation and start-up support for System x servers
  - Remote technical support for System x servers
  - Software support - Support Line:
    - Microsoft or Linux software
    - VMware
    - IBM Director

Regulatory compliance

The server conforms to the following standards:

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22, Class A
- IEC 60950-1(CB Certificate and CB Test Report)
- China CCC (GB4943), GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)

External disk storage expansion

The x3650 M4 supports attachment to external storage expansion enclosures, such as the EXP2500 series, by using the ServeRAID M5120 SAS/SATA Controller. The x3650 M4 can also be attached to supported external storage systems, such as the IBM System Storage® DS3500 series, using a supported HBA.

Table 26. RAID controllers and options for external disk storage expansion

Part number	Feature code	Description	Maximum supported	Standard models where used
81Y4478	A1WX	ServeRAID M5120 SAS/SATA Controller	4	-
Hardware upgrades for the M5120				
81Y4508	A22E	ServeRAID M5100 Series Battery Kit	1*	-
90Y5046	A2BB	x3650 M4 Remote Supercap and Battery Tray**	1	-
81Y4484	A1J3	ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade	1	-
81Y4487	A1J4	ServeRAID M5100 Series 512MB Flash/RAID 5 Upgrade	1	-
81Y4559	A1WY	ServeRAID M5100 Series 1GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5120				
81Y4544	A1X2	ServeRAID M5100 Series Zero Cache/RAID 5 Upgrade	1	-
90Y4318	A2MD	ServeRAID M5100 Series SSD Caching Enabler	1	-
90Y4273	A2MC	ServeRAID M5100 Series SSD Performance Key	1	-
81Y4546	A1X3	ServeRAID M5100 Series RAID 6 Upgrade	1†	-

* The ServeRAID M5100 Series Battery Kit (81Y4508) is only supported with ServeRAID M5100 Series 512MB Cache/RAID 5 Upgrade (81Y4484).
† The ServeRAID M5100 Series RAID 6 Upgrade (81Y4546) requires 512 MB or 1 GB cache upgrades.
** Cannot be installed if an internal tape drive is installed

The ServeRAID M5120 SAS/SATA Controller has the following specifications:

- Eight external 6 Gbps SAS/SATA ports
- Two external x4 mini-SAS connectors (SFF-8088)
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5100 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5100 Series RAID 6 Upgrade
- Supports 512 MB battery-backed cache or 512 MB or 1 GB flash-backed cache
- 6 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS2208 6 Gbps ROC controller
- Supports connectivity to the EXP2512 and EXP2524 storage expansion enclosures

For more information, see the IBM Redbooks Product Guide *ServeRAID M5120 SAS/SATA Controller for IBM System x* at:
http://www.redbooks.ibm.com/abstracts/tips0858.html?Open

The ServeRAID M5120 SAS/SATA Controller supports connectivity to the IBM System Storage external expansion enclosures listed in the following table. Up to nine expansion enclosures can be daisy-chained per one M5120 external port. For better performance, distribute expansion enclosures evenly across both M5120 ports.

Table 27. IBM System Storage external expansion enclosures

Part number	Description	Maximum quantity supported per one M5120
174712X	IBM System Storage EXP2512 Express	18
174724X	IBM System Storage EXP2524 Express	9

The external SAS cables listed in the following table support connectivity between external expansion enclosures and the ServeRAID M5120 SAS/SATA Controller.

Table 28. External SAS cables for external storage expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
39R6531	IBM 3 m SAS Cable	1
39R6529	IBM 1 m SAS Cable	1

The following table lists the drives supported by EXP2512 external expansion enclosures.

Table 29. Drive options for EXP2512 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
3.5-inch NL SAS HS HDDs		
49Y1903	1TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
49Y1902	2TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
90Y8720	3TB 7,200 rpm 6Gb SAS NL 3.5" HDD	12
3.5-inch SAS HS HDDs		
49Y1899	300GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1900	450GB 15,000 rpm 6Gb SAS 3.5" HDD	12
49Y1901	600GB 15,000 rpm 6Gb SAS 3.5" HDD	12

The following table lists the hard disk drives supported by EXP2524 external expansion enclosures.

Table 30. Drive options for EXP2524 external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
2.5-inch NL SAS HS HDDs		
49Y1898	500GB 7,200 rpm 6Gb SAS NL 2.5” HDD	24
81Y9952	1TB 7,200 rpm 6Gb SAS NL 2.5” HDD	24
2.5-inch SAS HS HDDs		
49Y1896	146GB 15,000 rpm 6Gb SAS 2.5” HDD	24
49Y1895	300GB 10,000 rpm 6Gb SAS 2.5” HDD	24
81Y9944	300GB 15,000 rpm 6Gb SAS 2.5” HDD	24
81Y9596	600GB 10,000 rpm 6Gb SAS 2.5” HDD	24
81Y9948	900GB 10,000 rpm 6Gb SAS 2.5” HDD	24
2.5-inch SAS HS SSDs		
81Y9956	200GB 2.5" SAS SSD	24
81Y9960	400GB 2.5" SAS SSD	24

External disk storage systems

The following tabel lists the external storage systems that are supported by x3650 M4 and can be ordered through the System x sales channel. The server might support other IBM disk systems that are not listed in this table. Refer to IBM System Storage® Interoperability Center for further information.

Table 31. External disk storage systems

Part number	Description
1746A2D	IBM System Storage DS3512 Express Dual Controller Storage System
1746A2S	IBM System Storage DS3512 Express Single Controller Storage System
1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System
1746A4S	IBM System Storage DS3524 Express Single Controller Storage System
181494H	IBM System Storage DS3950 Model 94
181498H	IBM System Storage DS3950 Model 98
181492H	IBM System Storage EXP395 Expansion Unit
1746A2E	IBM System Storage EXP3512 Express Storage™ Expansion Unit
1746A4E	IBM System Storage EXP3524 Express Storage Expansion Unit

For more information, see the list of IBM Redbooks Product Guides in the System Storage category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage

External backup units

The server supports the external backup attachment options that are listed in the following table.

Table 32. External backup options (Part 1)

Part number	Description
External tape expansion enclosures for internal tape drives	
87651UX	1U Tape Drive Enclosure
8767HHX	Half High Tape Drive Enclosure
87651NX	1U Tape Drive Enclosure (with Nema 5-15P LineCord)
8767HNX	Half High Tape Drive Enclosure (with Nema 5-15P LineCord)
Tape enclosure adapters (with cables)	
44E8869	USB Enclosure Adapter Kit
40K2599	SAS Enclosure Adapter Kit
Internal backup drives supported by external tape enclosures	
46C5364	IBM RDX Removable Hard Disk Storage System - Internal USB 160 GB Bundle
46C5387	IBM RDX Removable Hard Disk Storage System - Internal USB 320 GB Bundle
46C5388	IBM RDX Removable Hard Disk Storage System - Internal USB 500 GB Bundle
46C5399	IBM DDS Generation 5 USB Tape Drive
39M5636	IBM DDS Generation 6 USB Tape Drive
43W8478	IBM Half High LTO Gen 3 SAS Tape Drive
44E8895	IBM Half High LTO Gen 4 SAS Tape Drive
49Y9898	IBM Half High LTO Gen 5 Internal SAS Tape Drive
00D8924	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive

Table 32. External backup options (Part 2)

Part number	Description
External backup units*	
362516X	IBM RDX Removable Hard Disk Storage System - External USB 160 GB Bundle
362532X	IBM RDX Removable Hard Disk Storage System - External USB 320 GB Bundle
362550X	IBM RDX Removable Hard Disk Storage System - External USB 500 GB Bundle
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US line cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US line cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US line cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without line cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without line cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without line cord)
3580S3V	System Storage TS2230 Tape Drive Express Model H3V
3580S4V	System Storage TS2240 Tape Drive Express Model H4V
3580S5E	System Storage TS2250 Tape Drive Express Model H5S
3580S5X	System Storage TS2350 Tape Drive Express Model S53
3572S4R	TS2900 Tape Library with LTO4 HH SAS drive & rack mount kit
3572S5R	TS2900 Tape Library with LTO5 HH SAS drive & rack mount kit
35732UL	TS3100 Tape Library Model L2U Driveless
35734UL	TS3200 Tape Library Model L4U Driveless
46X2682†	LTO Ultrium 5 Fibre Channel Drive
46X2683†	LTO Ultrium 5 SAS Drive Sled
46X2684†	LTO Ultrium 5 Half High Fibre Drive Sled
46X2685†	LTO Ultrium 5 Half High SAS Drive Sled
46X6912†	LTO Ultrium 4 Half High Fibre Channel Drive Sled
46X7117†	LTO Ultrium 4 Half High SAS DriveV2 Sled
46X7122†	LTO Ultrium 3 Half High SAS DriveV2 Sled

* Note: The external tape drives listed can be ordered through System x sales channel. The server might support other IBM tape drives that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information.

† Note: These part numbers are the tape drives options for 35732UL and 35734UL.

For more information, see the list of IBM Redbooks Product Guides in the Backup units category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape

Top-of-rack Ethernet switches

The server supports the top-of-rack Ethernet switches from IBM System Networking listed in the following table.

Table 33. IBM System Networking - Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
0446013	IBM System Networking RackSwitch G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309CD8	IBM System Networking RackSwitch G8000DC
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
427348E	IBM Ethernet Switch J48E
6630010	Juniper Networks EX2200 24 Port
6630011	Juniper Networks EX2200 24 Port with PoE
6630012	Juniper Networks EX2200 48 Port
6630013	Juniper Networks EX2200 48 Port with PoE
IBM System Networking - 10 Gb top-of-rack switches	
7309DRX	IBM System Networking RackSwitch G8264CS (Rear to Front)
7309DFX	IBM System Networking RackSwitch G8264CS (Front to Rear)
7309BD5	IBM System Networking RackSwitch G8124DC
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
0719410	Juniper Networks EX4500 - Front to Back Airflow
0719420	Juniper Networks EX4500 - Back to Front Airflow
IBM System Networking - 40 Gb top-of-rack switches	
8036ARX	IBM System Networking RackSwitch G8316R
8036AFX	IBM System Networking RackSwitch G8316F

For more information, see the list of IBM Redbooks Product Guides in the Top-of-rack switches category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tor

Uninterruptible power supply units

The server supports attachments to the uninterruptible power supply (UPS) units listed in the following table.

Table 34. Uninterruptible power supply units

Part number	Description
Rack-mounted UPS	
21304RX	IBM UPS 10000XHV
53951AX	IBM 1500VA LCD 2U Rack UPS (100V/120V)
53951KX	IBM 1500VA LCD 2U Rack UPS (230V)
53952AX	IBM 2200VA LCD 2U Rack UPS (100V/120V)
53952KX	IBM 2200VA LCD 2U Rack UPS (230V)
53953AX	IBM 3000VA LCD 3U Rack UPS (100 V/120 V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200 V/208 V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200 V/208 V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230 V)
53959KX	IBM 11000VA LCD 5U Rack UPS (200V/208V/230V)

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Power distribution units

The server supports attachments to the power distribution units (PDUs) listed in the following table.

Table 35. Power distribution units (part 1)

Part number	Description
Switched and Monitored PDUs	
46M4002	IBM 1U 9 C19/3 C13 Active Energy Manager DPI PDU
46M4003	IBM 1U 9 C19/3 C13 Active Energy Manager 60A 3 Phase PDU
46M4004	IBM 1U 12 C13 Active Energy Manager DPI PDU
46M4005	IBM 1U 12 C13 Active Energy Manager 60A 3 Phase PDU
46M4167	IBM 1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4116	IBM 0U 24 C13 Switched and Monitored 30A PDU
46M4119	IBM 0U 24 C13 Switched and Monitored 32A PDU
46M4134	IBM 0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4137	IBM 0U 12 C19/12 C13 Switched and Monitored 32A 3 Phase PDU
Enterprise PDUs	
71762MX	IBM Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	IBM Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU+ (NA)
71763NU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU (NA)
39M2816	IBM DPI C13 Enterprise PDU without line cord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed line cord
39Y8941	DPI Single Phase C13 Enterprise PDU without line cord
39Y8948	DPI Single Phase C19 Enterprise PDU without line cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30 amp/125 V Front-end PDU with NEMA L5-30P connector
39Y8939	30 amp/250 V Front-end PDU with NEMA L6-30P connector
39Y8940	60 amp/250 V Front-end PDU with IEC 309 60A 2P+N+Gnd connector

Table 35. Power distribution units (part 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU with Denmark LC
39Y8954	DPI Universal Rack PDU with Israel LC
39Y8955	DPI Universal Rack PDU with Italy LC
39Y8956	DPI Universal Rack PDU with South Africa LC
39Y8957	DPI Universal Rack PDU with UK LC
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU with China LC
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
0U Basic PDUs	
46M4122	IBM 0U 24 C13 16A 3 Phase PDU
46M4125	IBM 0U 24 C13 30A 3 Phase PDU
46M4128	IBM 0U 24 C13 30A PDU
46M4131	IBM 0U 24 C13 32A PDU
46M4140	IBM 0U 12 C19/12 C13 60A 3 Phase PDU
46M4143	IBM 0U 12 C19/12 C13 32A 3 Phase PDU

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Rack cabinets

The server supports the rack cabinets listed in the following table.

Table 36. Rack cabinets

Part number	Description
201886X	IBM 11U Office Enablement Kit
93072PX	IBM 25U Static S2 Standard Rack
93072RX	IBM 25U Standard Rack
93074RX	IBM 42U Standard Rack
93074XX	IBM 42U Standard Rack Extension
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise Rack
93604EX	IBM 42U 1200 mm Deep Dynamic Expansion Rack
93604PX	IBM 42U 1200 mm Deep Dynamic Rack
93614EX	IBM 42U 1200 mm Deep Static Expansion Rack
93614PX	IBM 42U 1200 mm Deep Static Rack
93624EX	IBM 47U 1200 mm Deep Static Expansion Rack
93624PX	IBM 47U 1200 mm Deep Static Rack
99564RX	IBM S2 42U Dynamic Standard Rack
99564XX	IBM S2 42U Dynamic Standard Expansion Rack

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

Rack options

The server supports the rack console switches and monitor kits listed in the following table.

Table 37. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
17238BX	A3EK	IBM 1U 18.5" Standard Console
17238EX	A3EL	IBM 1U 18.5" Enhanced Media Console
172317X	0051	1U 17in Flat Panel Console Kit
172319X	0052	1U 19in Flat Panel Console Kit
Console switches		
1754D2X	6695	IBM Global 4x2x32 Console Manager (GCM32)
1754D1X	6694	IBM Global 2x2x16 Console Manager (GCM16)
1754A2X	0726	IBM Local 2x16 Console Manager (LCM16)
1754A1X	0725	IBM Local 1x8 Console Manager (LCM8)
Console cables		
43V6147	3757	IBM Single Cable USB Conversion Option (UCO)
39M2895	3756	IBM USB Conversion Option (4 Pack UCO)
39M2897	3754	IBM Long KVM Conversion Option (4 Pack Long KCO)
46M5383	5341	IBM Virtual Media Conversion Option Gen2 (VCO2)
46M5382	5340	IBM Serial Conversion Option (SCO)

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
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Related publications and links

For more information, see these resources:

- IBM System x3650 M4 product page
  http://www.ibm.com/systems/x/hardware/rack/x3650m4/index.html
- *IBM System x 3650 M4 Installation and User's Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5089516
- *IBM System x 3650 M4 Problem Determination and Service Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5089517
- ServerProven hardware compatibility page for the x3650 M4
  http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/xseries/7915.html
- IBM Redbooks Product Guides for IBM System x servers and options
  http://www.redbooks.ibm.com/portals/systemx?Open&page=pgbycat
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